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Business Wire

June 15, 1999

Recent Study Reveals Five Personality Types When It Comes to Retirement Planning.

NEWARK, N.J.--(BUSINESS WIRE)--June 15, 1999--

Retirement Personality Profiler Available On-line

Your personality type may hold the key to spending, saving, investing and retirement, according to the 1999 Retirement Confidence Survey, underwritten in part by Prudential. To help consumers identify their distinct personality, a new on-line tool - the Retirement Personality Profiler - was unveiled today.

"We found that basically people fit into one of five categories when it comes to retirement: Planners, Savers, Strugglers, Impulsives, and Deniers," said Dallas Salisbury, president and CEO of Employee Benefit Research Institute, which conducted the survey along with the American Savings Education Council and Mathew Greenwald & Associates. "These particular groups feel very differently about their approach toward planning for retirement," said Salisbury.

"Understanding your retirement personality and risk tolerance is an important first step to gaining more control over your financial future," said Ken Montgomery, president of Prudential Retirement Services.

An analysis of the workers and retirees in the Retirement Confidence Survey provides insight on their attitudes and actions toward their finances and planning for retirement:

- Planners (35% of Americans) believe that anyone can have a comfortable retirement. They'll take risks for gains.

Approximately three-fourths are confident they are investing their retirement savings wisely.

- Savers (18% of Americans) are like Planners, but they're more

cautious investors. More than half are not willing to take any financial risks - no matter what the gains and they characterize themselves as savers, not investors.

- Strugglers (20% of Americans) are disciplined savers, but are easily discouraged by unexpected events. Ninety-four percent consider themselves to be savers rather than investors.

- Impulsives (15% of Americans), on the other hand, are sporadic savers and are frequently set back. More than half spend money when they do not plan to buy anything.

- And Deniers (13% of Americans) feel it's pointless to plan for retirement at all. Many are impulse shoppers and are frequently set back from their financial goals or unwilling to take any financial risks no matter what the gain.

"Planners have median retirement savings of more than \$73,000. Compare that to the 13% who are Deniers," said Salisbury. "They saved only \$7,000 on average, which may put them at a disadvantage financially in retirement," he said.

"If you're a Planner or Saver, stay the course and learn even more about investing," said Montgomery. "Strugglers and Impulsives should re-examine their savings habits and focus on the long term. Deniers need to face the facts and get a plan together now," he said.

"In addition, this year's Retirement Confidence Survey found that a significant number of Americans expressed confidence about their retirement, yet the survey also uncovered a false confidence," said Montgomery. "One reason for the false confidence is that only half of workers have tried to determine how much they will need to save by the time they retire."

The ninth annual Retirement Confidence Survey, conducted in January and February of 1999, interviewed 1,002 individuals (751 workers and 251 retirees) aged 25 and older. The maximum range of error for the survey is plus or minus three percentage points at the 95% confidence level. The Retirement Personality Profiler is available at www.ebri.org/rcs/1999/_results.htm.

Prudential is a Charter Member of the American Savings Education Council and has maintained a long-standing business relationship

with the Employee Benefit Research Institute since 1992.

Prudential Retirement Services is exclusively dedicated to providing quality defined contribution and defined benefit services for public, private and non-profit organizations, offering a combination of investment management expertise, state-of-the-art record-keeping, and comprehensive investment education programs. With over 71 years of experience in managing retirement plans, Prudential today manages more than \$240 billion in retirement assets.

Prudential, with \$375 billion in total assets managed and administered, is the largest life insurance company in the United States, and one of the largest diversified financial institutions in the world. Prudential has a global presence in 30 countries, providing a variety of products and services in the areas of investments, insurance, securities, and real estate to more than 30 million customers.

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T S2/FULL/10

2/19/10 (Item 2 from file: 636)

DIALOG(R)File 636:Gale Group Newsletter DB(TM)

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03940255 Supplier Number: 50226380 (THIS IS THE FULLTEXT)

PRODUCT DEVELOPMENT: MONTGOMERY FUNDS ADDS ONLINE QUIZ, JAPAN INFO

Financial Net News, v3, n30, pN/A

July 27, 1998

Language: English Record Type: Fulltext

Document Type: Newsletter; Trade

Word Count: 298

TEXT:

The Montgomery Funds has rolled out an online interactive investing quiz and an update on the ongoing Japanese financial crisis. The San Francisco fund shop added the quiz on its Web site to build on recent transactional plans and to get customers acclimated to using the Web for interactive purposes, according to a spokesman. Montgomery began making plans to launch account access transactions earlier this year and will complete a full rollout later this month (FNN, 4/13). The firm added the Japan section in part to respond to lingering customer concerns regarding the country's financial crisis and because several of the firm's funds, such as the Montgomery International Growth Fund and the Montgomery Global Opportunities Fund, have exposure to Japanese stocks, the spokesman said.

The online test, called the Investment Personality Quiz, asks 15 questions on subjects such as projected future income, expected future investment returns and investing styles. Montgomery's server analyzes responses in several seconds and rates the user's investing type in categories such as conservative, moderate or aggressive. A pie chart is also offered with a suggested percentage breakdown of an entire portfolio consisting of Montgomery funds. Users interested in more information can link to a prospectus section and have information sent to them. The tool was built in-house and the spokesman could not provide costs, indicating that it was not expensive.

The Japan section is part of an ongoing series of Montgomery missives that address investing themes. It was written by John Boich, principal at Montgomery. In the section, Boich writes that if the Yen continues its decline Asia may be in for a prolonged recession. Earlier this year, Montgomery posted information on its site regarding nuclear testing in India and Pakistan the potential effects it might have on the economy (FNN, 6/8).

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Set	Items	Description
S1	1	PERSONALITY (W) BASED (W) PRODUCTS
S2	0	PERSONALITY (W) BASED (W) SERVICE?
S3	1	INVESTMENT (W) STRATEGY AND PERSONALITY (W) TYPE AND TEST
S4	4	INVESTMENT (W) STRATEGY AND PERSONALITY (W) TYPE AND QUESTION?
S5	4	RD (unique items)
S6	5	INVESTMENT (W) STRATEGY AND PERSONALITY (W) TYPE
S7	18	PMF AND PERSONALITY
S8	16	RD (unique items)
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Set	Items	Description
S1	0	PERSONALITY (W) BASED (W) PRODUCTS
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S3	0	INVESTMENT (W) STRATEGY AND PERSONALITY (W) TYPE AND TEST
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S5	1	RD (unique items)
S6	1	INVESTMENT (W) STRATEGY AND PERSONALITY (W) TYPE
S7	1	PMF AND PERSONALITY
S8	1	RD (unique items)
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7/19/1 (Item 1 from file: 9)

DIALOG(R)File 9:Business & Industry(R)

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2290583 Supplier Number: 02290583 (THIS IS THE FULLTEXT)

PMF launches financial planning package

(Pacific Mutual Fund adds its Golden Personal Investment Plan to its family of financial planning guides)

Business Times (Malaysia), p N/A

November 11, 1998

DOCUMENT TYPE: Journal (Malaysia)

LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 389

TEXT:

PACIFIC Mutual Fund Bhd (PMF) yesterday launched its Golden Personal Investment Plan, a new addition to its family of financial planning guides known as the Golden Programme.

The Golden Personal Investment Plan is a sound, practical and simplified financial planning package which will help save investors hours of time.

This is possible as it allows investors to spend their time effectively in assessing their risk profile, financial status and goals, and suitable investment strategy.

PMF chief executive officer Ms Judy Yap Soh Li said in a statement that this is the most appropriate time to introduce the Golden Personal Investment Plan as it will help investors create an effective investment strategy particularly in times of adversity.

"Under the current rapidly changing investment environment, our unit trust consultants bear the responsibility especially in these trying times to assist investors in making informed decisions on investments," she said.

By having a flexible financial plan, she said investors will not panic or be alarmed over short-term fluctuations during economic crisis.

"It is important to remember that anything we want out of life requires planning," she added yesterday.

The Golden Personal Investment Plan consists of seven simple steps. Step one will help investors identify their life cycles of investing. Investors with differing age and financial commitment will fall under different stages.

In the second and third step, it will guide investors to calculate their net worth and cash flow respectively.

This will help them to know where they stand financially.

Step four is a Risk Assessment Quiz that will aid investors to discover the type of investors they are, whether they are conservative, moderate or aggressive.

Investors who are clear about their risk profile can easily choose the right fund as described under the fifth step.

Step six will assist the investors to plan an effective diversified investment portfolio to achieve their financial goals.

This flexible plan is open for review when factors affecting it change over time.

The last stage advises investors on when and how to revise the plan. In

total, these steps will lead investors to discover their investment personality and risk profile which is crucial to build an effective investment portfolio to reach their financial goals despite short-term adversity.

In addition, investors will be able to better manage return expectations when they recognise their own risk or reward spectrum.

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COMPANY NAMES: PACIFIC MUTUAL FUND BHD

PRODUCT NAMES: Mutual fund investment companies (672200)

CONCEPT TERMS: All company; All product and service information; Corporate strategy; Product introduction

GEOGRAPHIC NAMES: Malaysia (MAY); Pacific Rim (PARX); Southern & Eastern Asia (SSAX)

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ABOUT INVESTMENT

- Eight Principles Of Successful Investing In Unit Trust
- Close-Watch
- Funds Performance
- Golden Strategies In Financial Planning
- Fund Fact Sheet

Check Your Risk Profile***What Kind Of Investor Are You?***

Before starting out on your journey of investment, you first need to recognise your character as an investor. Once this is done, it will help make your investment decisions much easier.

Determining how to allocate your funds is one of the most important decisions in life and you need to ensure that you have explored all possibilities before taking the first step.

You need to seriously consider where to invest, what to invest in, how long you plan to keep your money invested, what you expect from your investment and how much risk you can take.

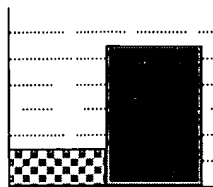
Our Risk Assessment questionnaire below will guide you through this recognition process, and help you determine whether you are a conservative, moderate or aggressive investor.

Risk Assessment Quiz

1. My age is :
 - ☐ under 40
 - ☐ 40 - 55 years old
 - ☐ 56 or older
2. How would you describe your investment style?
 - ☐ Conservative
 - ☐ Moderate
 - ☐ Aggressive
3. How familiar are you with investing?
 - ☐ I know nothing at all
 - ☐ I am reasonably familiar with the basic types of investments, including unit trust funds
 - ☐ I am both knowledgeable and experienced in general investment
4. How long do you plan to hold your investment?
 - ☐ Below 2 years
 - ☐ 3-5 years
 - ☐ 6 years or more

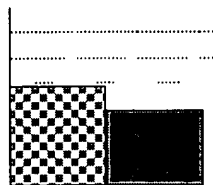
5. Which of the following best describes what you need from your investments?

- ☐ I don't need a lot of growth potential. Rather, I need a steady, relatively predictable flow of income.



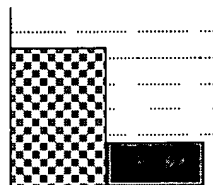
Growth Income

- ☐ I need growth to keep building towards future goals, but I don't want to put a major portion of my assets in investments that may fluctuate a lot.



Growth Income

- ☐ I don't need income right now. I am more interested in giving my portfolio as much growth potential as possible over the long term.



Growth Income

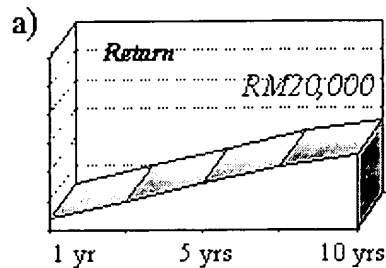
Note:

Growth = capital gains

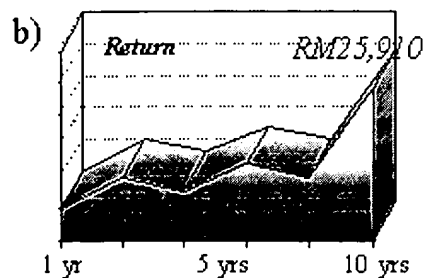
Income = dividend/interest

6. Below, you'll see three hypothetical models. The charts show how your RM10,000 investment have grown over the past 10 years. Which investment -- taking into account both return and volatility -- looks most attractive to you?

☐

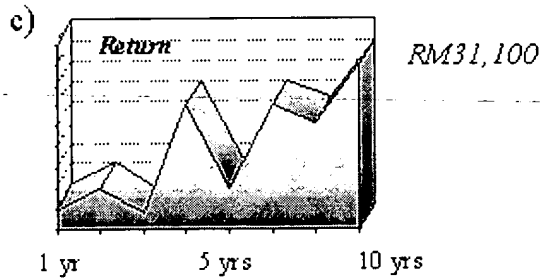


☐



These illustrations do not represent the returns of any Pacific Mutual's Fund

☐



7. Do you have an emergency fund for short-term cash needs ? (3 to 6 months' salaries)
- ☐ No.
 - ☐ I'm in the process of saving.
 - ☐ Yes, I have an adequate emergency fund.
8. If you have invested RM10,000 in an equity unit trust with a good historical performance record, and you lost RM1,500 (15%) over the course of a few months, you would....
- ☐ Sit tight and hope the Fund would bounce back.
 - ☐ Sell your unit trust in an effort to avoid possible further losses.
 - ☐ Invest an additional amount, since the unit price now cost less to buy.
9. If I could significantly increase my returns by taking more risk, I would...
- ☐ Be willing to take a lot more risks with all of my money.
 - ☐ Be willing to take a little more risks with some of my money.
 - ☐ Be unlikely to take much more risks.
10. Which statement best describes your long-term investment strategy?
- ☐ I'm willing to take the highest investment risks to reap potential substantial rewards.
 - ☐ I'm willing to accept only a small degree of investment risks.
 - ☐ I'm willing to take a moderate degree of risks with my investment today for potentially higher rewards in the future.

Submit**Reset**

Thank you, the following are your Total Score and your Investor Profile.

Total score: 77	Your Investor Profile: <i>Aggressive</i>
<p>You are probably willing to take a significant amount of risks to achieve potentially higher returns. You are an investor who wants access to stock market opportunities, seeking potentially high investment returns and try to maximise capital growth over the long-term. You can accept that investment returns may fluctuate significantly over the short term and may be negative. If the market dips you look at it as a buying opportunity or aren't likely to sell in a panic.</p>	
<div><div><input type="checkbox"/></div><div>Model Portfolio</div><div><input type="checkbox"/></div></div>	

Please keep in mind that this personality quiz is designed to be used as a guideline for conservative to aggressive investors and to serve as educational tools, not investment advice. For more detailed investment advice, we recommend that you speak to our unit trust Consultants, Customer Service personnel or your financial adviser. To reach us, please e-mail pmfb@pmfb.po.my or call 603-7725 9877





Thank you, the following are your Total Score and your Investor Profile.





Total score: 70	Your Investor Profile: <i>Moderate</i>
<p>You understand risk and are fairly comfortable with it, but you are not prepared to speculate. You are an investor who wants a diversified portfolio yet prefer a higher exposure to equity investments which are more likely to provide higher returns over the longer term. You also accept that investment returns may be negative over the short term and likely to feel most comfortable with a balance of asset classes that provide capital growth and high income prospects. If you are in your 30's and 40's you should be willing to take on a fair amount of risks with your savings for a long-term goal like college for your children or retirement.</p>	
<div><div><input type="checkbox"/></div><div><input type="checkbox"/></div><div>Model Portfolio</div><div><input type="checkbox"/></div></div>	


Please keep in mind that this personality quiz is designed to be used as a guideline for conservative to aggressive investors and to serve as educational tools, not investment advice. For more detailed investment advice, we recommend that you speak to our unit trust Consultants, Customer Service personnel or your financial adviser. To reach us, please e-mail pmfb@pmfb.po.my or call 603-7725 9877

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Key Information Of Pacific Mutual's Funds

Fund Profile/ Category	Fund Name & Focus	Asset Allocation	Investment Objective	Target Investors	Distribution Policy*	Others Information
Aggressive	PACIFIC  PROGRESSIVE FUND Technology	Equities- Max. 95%	Aims to achieve maximum capital growth and income over a medium to long-term period by investing in securities of companies in the technology industry that offers strong growth prospects.	Investors seeking high capital growth over the medium to long term and willing to accept a higher degree of risk in return for potentially higher investment gains in the technology sector.	Unit split once a year in December.	- Fund Performance - Fund Fact Sheet - Price Performance
	PACIFIC  RECOVERY FUND Recovery	Equities- Max. 90%	Aims to provide above average returns in the form of capital growth over a medium and long-term period by investing mainly in cyclical stocks, stocks that are likely to be crisis survivors, as well as stocks that are undergoing restructuring, which may offer considerable recovery prospects.	Investors seeking high capital growth over the medium to long term and willing to accept a higher degree of risk in return for potentially higher investment gains following any economic downturn, industry-wide cyclical downturn or corporate restructuring exercise.	Unit split once a year in June.	- Fund Performance - Fund Fact Sheet - Price Performance
	PACIFIC  DANA KLSI Islamic Index	Equities- Max. 95%	Aims to provide medium to long-term capital growth by tracking the KLSE Syariah Index (KLSI).	Investors seeking capital growth over the medium to long term, while abiding by the Syariah principles, and having a moderate to high tolerance level for risks.	Income distribution, if any, once a year in March.	- Fund Performance - Fund Fact Sheet - Price Performance
Fairly Aggressive	PACIFIC  PEARL FUND	Equities- Max. 85%	Aims to achieve maximum capital growth over a medium to long-term period by investing in small and medium-sized companies that have excellent prospects for growth.	Investors seeking high capital growth of small- and medium-sized companies with excellent growth potential over the medium to long term.	Unit split and/or income distribution once a year in March.	- Fund Performance - Fund Fact Sheet - Price Performance

	Small Cap					
	PACIFIC  MILLENNIUM FUND Large Cap	Equities- Max. 85%	Aims to achieve long-term capital growth, with income as its secondary objective, by investing in fundamentally sound companies with market capitalisation of at least RM500 million for each company.	Investors seeking steady capital and income growth of large companies whose current prices may fail to reflect their long-term values over the medium to long term.	Income distribution and/or unit split once a year in June.	- Fund Performance - Fund Fact Sheet - Price Performance
	PACIFIC  PREMIER FUND Growth & Income	Equities- Max. 80%	Aims to maximise returns in both income and capital growth over a medium to long-term period through professionally managed investment in a portfolio of securities that provides capital growth and high income prospects.	Investors seeking current returns potentially higher than fixed deposit interest rates and moderate capital growth over the medium to long term.	Income distribution and/or unit split once a year in September.	- Fund Performance - Fund Fact Sheet - Fund Performance
Fairly Conservative	PACIFIC  DANA AMAN Islamic Growth & Income	Equities- Max. 75%	Aims to achieve consistently above average returns in both income and capital growth over a medium and long-term period by investing in a wide portfolio of authorised securities and other investments which comply with Syariah principles.	Investors seeking above average income and capital growth over the medium to long term in investments which comply with Syariah principles.	Income distribution and/or unit split once a year in March.	- Fund Performance - Fund Fact Sheet - Fund Performance
	PACIFIC  INCOME FUND Balanced Income	Equities- Max. 40%	Aims to achieve consistently attractive and stable income with reasonable preservation of capital by investing in a diversified portfolio of fixed income securities such as bonds and money market instruments as well as stocks that offer a steady dividend income stream. The Fund may also provide moderate capital growth potential over a medium to long-term period.	Investors seeking a steady income stream with returns higher than fixed deposit rates and moderate capital growth with reasonable preservation of capital over the medium to long term.	Income distribution once a year in September.	- Fund Performance - Fund Fact Sheet - Fund Performance

Conservative	PACIFIC  DANA MURNI Islamic Bond	Islamic Debt Securities- Max. 95%	Aims to achieve a stable income stream with reasonable protection of capital by investing in a diversified portfolio of Islamic debt securities and other liquid assets which comply with Syariah principles. The Fund may also provide some degree of capital growth potential over a medium to long-term period.	Investors seeking steady returns higher than general investment accounts with reasonable protection of capital, while abiding by the Syariah principles. It is suitable for investors seeking a regular income stream and moderate capital growth.	Income distribution, if any, once a year in March.	- Fund Performance - Fund Fact Sheet - Fund Performance
* Distributions are not guaranteed and may not be reflected of future distributions.						

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2/19/2 (Item 2 from file: 15)

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Wall Street takes to the highway

Del Prete, Dom

Marketing News v31n2 PP: 16, 19 Jan 20, 1997 CODEN: MKNWAT ISSN:
0025-3790 JRNL CODE: MNW

DOC TYPE: Journal article LANGUAGE: English LENGTH: 2 Pages

WORD COUNT: 1347

ABSTRACT: More than 100 brokerage firms and dozens of mutual fund companies either have launched their own Web sites or are in the process of doing so. Financial shops are highly motivated to set up shops in cyberspace for several reasons, among them: Their clients and prospects see the information superhighway as an important artery on the road to financial independence, and clients want the convenience of receiving financial services through their desktop computers.

TEXT: Two years ago, you needed a map to find Wall Street's presence on the information superhighway. Not anymore. Since then, more than 100 brokerage firms and dozens of mutual fund companies either have launched their own Web sites or are in the process of doing so.

Financial companies are highly motivated to set up shop in cyberspace for several reasons, among them: Their clients and prospects see the information superhighway as an important artery on the road to financial independence, and clients want the convenience of receiving financial services through their desktop computers.

On many of the Web sites, investors can obtain price quotes, educational information on investment products and services, calculators to help them determine the amount needed to reach specific goals, and email to help them communicate directly with the companies.

Small firms that once served regional markets now attract investors nationwide thanks to the highway. "Internet trades, which literally didn't exist at our firm until September 1995, now comprise 40% of our business," said Lise Olson, director of marketing for San Francisco-based Lombard Brokerage.

The pioneers of Web site marketing were not the large, well-known firms, such as Merrill Lynch and Smith Barney. Howe Barnes Investment, a small Chicago-based brokerage firm, is widely credited with establishing the first Web site trading service two years ago.

On-line trading is still relatively new, but it's catching on as evidenced by the growing number of discount brokers offering investors the opportunity to trade securities from their computers. Some firms, such as Charles Schwab, have developed proprietary software programs for this purpose.

Full-service brokerage companies, such as PaineWebber, plan to counter by giving customers the ability to communicate directly with their financial advisers through the Internet. Retrieving account information online may be commonplace within the next few years, as new measures are created to help stem security fears.

Is trading on the Internet safe?

"I think so," says Don Montanaro, vice president of electronic services at Quick & Reilly in New York. Companies have several alternatives to ensure security on their systems, in addition to taking certain precautions.

"For example, on the Internet, we do not request information from clients that a computer hacker could use against them," Montanaro said, "and we won't release funds from an account without receiving the necessary information, including signature."

Financial company Web sites are as varied as the firms themselves. Some are bare-bones basic. Case in point: D.A. Davidson, a regional brokerage firm in Great Falls, Mont. It simply offers visitors information about the firm and the types of products and services available. Others dress up their sites with features that go beyond the ordinary.

Want a commentary on the market or the economy? Several Web sites offer this option, and some give more than just the words. Investors who access CS First Boston's Web site can download a video commentary as well as the necessary software to take advantage of this feature.

An increasing number of companies are using their Web sites to promote employment opportunities at their firms. At this writing, Alex Brown, an investment banking firm in Baltimore, was advertising for a computer specialist in the information support system area.

While most companies are interested in targeting retail investors, some also are eyeing corporations and other businesses for investment banking purposes. Advest, a regional firm in Hartford, Conn., is one such company. "Viewers can find information about our research and investment banking capabilities for industry groups in which we specialize," said Art Meizner, vice president of marketing.

Several full-service brokerage firms use their Web sites to promote investment and financial planning seminars given by their registered representatives. A.G. Edwards provides a map; investors simply click on the state in which they are located to learn about seminars in their area.

Prudential Securities offers a virtual branch office whereby individuals can take an investment personality quiz. Individuals answer about 20 questions, providing the company with valuable information about investor attitudes toward personal investing.

Like other Web sites, Prudential's also offers a glossary of terms so investors can obtain quick explanations on commonly used financial terms. The site also helps investors locate financial advisers in their areas. By simply plugging in their Zip codes, individuals receive an introductory letter from one of the firm's advisers.

Some companies view their Web sites as opportunities to tout their mission statements. On its site, Merrill Lynch positions itself as a company that "understands the many personal and business financial decisions" faced by investors and will create a "comprehensive plan" that can put investors "on the road to success."

Salomon Brothers, an investment banking firm and securities dealer in New York, has a section on its Web site called In The News, which includes brief articles that announce new investment recommendations. The site also includes contacts and telephone numbers for professionals to obtain more information.

"Value-added" is the way Bob Stickler, manager of external communications at Barnett Bank, likes to describe his firm's Web site. Barnett, which positions itself as the leading mortgage lender in Florida, offering a full range of financial services, has designed its site to appeal to those thinking of relocating to the Sunshine State.

"We offer a newcomer's kit, which includes a map, and other helpful information, such as telephone numbers of important service companies," he said from his office in Jacksonville. "Additionally, you can find details concerning local schools and health care facilities as well as applications for many of our products."

Some companies, such as Ameritas Investment Corp., use their Web sites to cut operating costs. "Illustration software we used to mail to brokers is now available online," said Barry Ritter, a senior vice president at the firm's headquarters in Lincoln, Neb. Ameritas plans to make prospectuses available to investors on its site this year.

The Employee Benefit Research Institute (EBRI), a Washington, D.C.,-based nonprofit organization whose clients include brokerage firms and mutual fund companies, also has cut operating costs by posting some of its more popular publications on its Web site.

"Member firms who rely on us for immediate information also benefit, because they don't have to wait for the next business day to request those publications," said Ken McDonnell, a research analyst at EBRI. "To date, the response that we have received from our members regarding this service has been extremely positive."

Several companies are interested in seeing how investors will respond to obtaining free access to proprietary information. For instance, Morgan Stanley's Web site highlights events shaping the financial markets around the globe based on research and analysis provided to its regular clients.

Want to promote an employee who might attract some attention? PaineWebber is seeking to do just that by giving its Web site visitors the opportunity to submit questions by e-mail to Mary Farrell, a panelist and occasional host of "Wall Street Week" who is also the firm's chief investment strategist.

Some firms do an excellent job of directing individuals to a place on their Web site that provides an excellent overview of the firm's capabilities. Take Fidelity Investments' site. An investor who clicks on the personal investing screen arrives at a section called "new offers for investors." This leads to a screen that provides information about Fidelity as well as hyperlinks to the firm's list of services.

Assuming the Internet is not just a passing phenomenon, look for even small companies to set up multiple Web sites in the future. Many large firms already have implemented this strategy. In addition to having their own sites, many firms have added a location with one or more of the major on-line providers, such as America Online.

The various sites usually offer different services. For example, Vanguard's AOL location provides a library of articles among other features, while its own Web site contains closing fund prices.

Executives are reluctant to estimate what percentage of their firm's new business will come from the Internet or what percentage of their existing clients will choose to do business on-line. But no one denies that the road to Wall Street along the information superhighway will continue to expand in 1997.

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PRUDENTIAL SECURITIES TO LAUNCH WEB SITE THAT GIVES CLIENTS ACCESS TO THEIR ACCOUNTS

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'Virtual' Branch Gives Visitors Daily Market Updates

NEW YORK, Oct. 16 /PRNewswire/ -- Prudential Securities Incorporated (PSI) announced today the introduction of its world wide web Internet site where, in a roll out beginning January 1, 1996, PSI clients will be able to review the daily status of their accounts, including their cash balances, the total net worth of their portfolios and the market value of their securities, their transaction history, portfolio allocation and the funds available for withdrawals.

In its initial phase, which goes live today, PSI has created the "Virtual Branch Office," where the general public will find daily market commentary written by PSI market analysts. The "Virtual Branch Office" will also include an educational section about Investing and Investments, where viewers can experiment with a Financial Calculator feature that lets them enter personal financial data and receive financial planning information about funding a college education, planning for retirement, or achieving other financial goals. The web site address is www.prusec.com.

"This is a significant step into the future for Prudential Securities that will greatly enhance our ability to inform our clients," said Stanley F. Witkowski, Director of Strategic Client Initiatives. "The Internet offers us an opportunity to provide our clients with the type of information they need, when they need it. We believe our web site will greatly enhance the relationship between Prudential Securities Financial Advisors and their clients."

Prudential Securities' web site also allows visitors to better understand how their personalities affect their financial-planning and investing activities by taking the Investment Personality Quiz, a unique instrument that provides insights into risk tolerance and financial goal setting. Based on the results, a visitor is guided, by hypertext links, to other features of the web site.

Client Access Features

The site's second phase, which will be rolled out through the 1996 first quarter, will offer clients the following:

Balances -- a daily updated listing of each client account's net worth, cash balances, security market values, and funds available for withdrawal.

Positions -- a detailed listing, updated daily, of the individual securities held in a portfolio, including symbol, quantity, closing price, and market value, as well as research opinion on a client's equity holdings.

Transaction History -- a detailed history of all account activity for the previous 35 days, including trading activity; income and distributions and cash activities.

Statement - an on-line version of the statement each client receives in the mail, including the name and phone number of their Financial Advisor, the total account net worth, portfolio detail, account activity and market value of each investment, including dividends and interest.

Portfolio Allocation -- a pie-chart that divides an account into its separate investment types.

Hot Links -- detailed information about each feature will be available through hypertext to allow clients to better understand investing terms and

calculations.

E-Mail -- a system that allows clients to route e-mail to Financial Advisors.

"Virtual Branch Office" Features

Available immediately, the general public -- and clients as well -- who visit the site will find:

Daily Market Update -- as described earlier, browsers can review PSI market analysis updated at the end of each business day. Visitors can also request that select research publications be sent to them.

Financial Advisor Locator -- an automatic listing of the PSI branch located closest to a visitor by selecting a state or entering a zip code.

Investing and Investment -- information on investment products and services, including mutual funds, CDS, annuities, IRAs, municipal bonds and more, along with a glossary of terms.

A to Z Search - This feature helps a visitor to locate a specific feature within the site.

PSI will make the account access service available free of charge for the following accounts:

- COMMAND Accounts and the accounts in their household;
- Retirement Accounts and the accounts in their household;
- Households with total assets of \$500,000 or more.

Prudential Securities Incorporated is a fully diversified, global securities firm based in New York City, serving clients in the U.S. and overseas through approximately 6,000 Financial Advisors. The fifth-largest brokerage firm, Prudential Securities is a subsidiary of The Prudential Insurance Company of America.

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10/16/95

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Personnel selection.

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ABSTRACT: Recent personnel selection research has focused on models and criteria of performance, prediction of job performance based on personality measures and the fit between persons and organizations. The first two themes have converged with the discovery of interpretable linkages between predictors and performance criterion constructs. Other issues include validity and utility, additional issues related to statistical methods and measurement, equal opportunity in employment and other legal issues, and selection of personnel for work groups.

TEXT:KEYWORDS: performance, validity, industrial/organizational psychology
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INTRODUCTION

Our critical review covers roughly the period of mid-1993 through early 1996. Computerized and manual literature searches, as well as invitations to more than 100 active researchers in the field to submit relevant materials, have resulted in a wide range of published and unpublished literature to review. The chapter is necessarily selective, emphasizing what we believe are the most important and interesting developments in the area of personnel selection.

Three major themes are especially critical for selection research and practice. First, increased attention is being focused on criteria and models of performance. This attention is very important because enhanced knowledge about criterion constructs will lead to better understanding of predictor-criterion linkages, and accordingly, to advances in the science of personnel selection.

The second theme involves the burgeoning interest in personality measures as predictors of job performance. It is becoming increasingly apparent that job performance is a function of both ability and motivational or dispositional factors, and that the latter elements of performance have links to personality. In our view, these two themes merge when it is recognized that development of performance models that differentiate criterion constructs reveal highly interpretable relationships between ability, personality, job knowledge, technical proficiency, and work performance.

The third theme relates to increased activity in person-organization (P-O) fit research, in part, we believe, as a reaction to emerging

organizational realities including: 1. Organizations increasingly employ task-force teams whose members rotate from activity to activity rather than staying in one job. 2. In a related manner, as globalization and downsizing of many organizations continue apace, they are compelled to require more of employees, including "continuous improvement" in acquisition of new skills and flexibility in work focus as the external business environment changes. These realities argue for greater reliance on selecting people according to their general fit to the organization rather than for a particular job. In addition to expanding on these themes, we cover recent literature on performance measures, abilities, personality, interviews, biodata, computerized testing, selection for teams, applicant reactions, validity, psychometrics, equal employment opportunity (EEO) issues, and P-O fit.

PERFORMANCE AND CRITERIA

Job analysis continues to be an important first step in selection research and practice. A recent major development in this area is a Department of Labor initiative to analyze virtually all jobs in the US economy in order to build a database of occupational information (O*Net). This database may be used by organizations and individuals to help match people with jobs (Peterson et al 1995). O*Net has as its basis a content model of occupational characteristics and person requirements. This content model consists of hierarchically organized taxonomies (e.g. skills, generalized work activities) so that users can enter the database at different levels of specificity according to their needs. Several occupations have been mapped using the content model, and the ultimate goal is to get close to complete coverage for the US economy. The person-job fit feature of the O*Net will enable comparisons between content-model person attributes and targeted occupational requirements. There is also an organizational-characteristics component in the content model that may facilitate P-O matches. The hope is that O*Net will help unemployed workers and students entering the workforce to find more appropriate jobs and careers, and employers to identify more highly qualified employees. These matches should be realized more systematically and with more precision than has been possible heretofore. An additional hope is that this initiative will encourage research that further advances the effectiveness of person-job matching, person-organization fit, and the science of personnel selection.

In a Fortune article, Bridges (1994) wrote about the "end of the job," how increasingly work will not be packaged in familiar envelopes we call jobs. Organizations that used to have a structure of jobs now have "fields of work." As mentioned above, people are increasingly on project teams that exist only as long as the project lasts, at which time they move to another project (Bridges 1994). Selection in such a context is still necessary. The task is to match knowledges, skills, abilities, and other personal characteristics (KSAOs) to requirements of the work. Lawler's (1994) essay on competency-based organizations is instructive on this topic. He believes that selection in this type of organization will require identifying persons who fit the "learning environment" and are likely to be capable of developing the skills necessary to do the organization's work. In a related manner, Sparrow (1994) discussed the effect on selection practices of flatter organizations, with a task force, team approach to getting work done. Selecting for adaptability, interactional skills, a willingness to learn, and a repertoire of multiple skills predicted to be important to future organizational functioning will be increasingly important. More research on this topic appears in the section on "Person-Organization Fit."

As mentioned, job performance models are beginning to foster more scientific understanding of criteria. These models have at least two different forms. One type attempts to explicate the central latent variables that can best characterize all performance requirements in work. A second type examines relations between elements of performance (e.g. job knowledge and proficiency) toward learning more about the criterion space. Regarding the first type, Campbell et al (1993) posited eight latent criterion factors that summarize the performance requirements for all jobs. Several of these latent constructs emerged consistently in the Project A research (a large-scale selection and classification study conducted in the

US Army (Campbell 1990)), across the many jobs studied in that program. Accordingly, there is some impressive empirical support for at least part of this performance taxonomy. The importance of this research direction is considerable. The criterion domain should be carefully mapped, just as various predictor areas have already been (e.g. abilities and personality). This specification of criterion content should importantly shape the way selection research gets done (Campbell et al 1993). Consistent with one theme of this review, a criterion taxonomy will help to organize accumulating research findings by addressing questions about links between predictors and individual criteria rather than predictors and overall performance. Research by McCloy et al (1994) supports this view of predictor-criterion relations. These authors divided the criterion space into declarative knowledge, procedural knowledge and skill, and motivational components. Using data from eight jobs in Project A, they demonstrated that declarative knowledge is predicted primarily by cognitive ability, whereas the motivational element of performance (indexed by ratings) is linked to personality.

The second type of job performance model first emerged in Hunter (1983), in which path analysis results suggested that ability has primarily a direct effect on individuals' acquisition of job knowledge which, in turn, influences job holders' technical proficiency. Supervisory performance ratings were a function of both ratee job knowledge and technical proficiency. Subsequent research focused more on antecedents of performance ratings. A recent paper (Borman et al 1995) concluded that ratee technical performance and dependability were equally influential on supervisory ratings. This finding confirms results from Motowidlo & Van Scotter (1994) that technical and contextual performance (Borman & Motowidlo 1993)--the latter similar to prosocial organizational behavior--are roughly equally weighted by supervisors in making overall performance ratings. Other studies have reported similar results (e.g. Dunn et al 1995, Ferris et al 1994, Werner 1994), although McIntyre & James (1995) demonstrated that dimension weights differ for different ratees. We believe this work on job performance models is important in that, like Campbell's effort, it differentiates criterion constructs, and attempts to increase understanding of each, as well as of relationships among them. To underscore this point, Campbell et al (1996) urged that in structural models such as Hunter's (1983) and Borman et al's (1995), we move beyond studying overall performance ratings as the dependent, endogenous variable to examining individual dimensions of performance from the substantive models referred to previously (e.g. Campbell et al 1993). These thrusts to differentiate criterion constructs conceptually and, most importantly, in measuring them are prerequisites toward systematically studying links between individual predictor and criterion variables.

In fact, such links have been explored. Project A validation results show that ability best predicts performance on the technical proficiency criteria, and personality, especially dependability, best predicts performance on the contextual dimension, personal discipline. Motowidlo & Van Scotter (1994) and Van Scotter & Motowidlo (1996) found that personality predictors generally correlated higher with contextual performance than with task performance. DuBois et al (1993) also demonstrated that when the criterion space is divided up and separate elements are correlated with predictor scores, a coherent pattern of relationships emerges. In a sample of supermarket checkers, these authors found that general cognitive ability correlated higher with a maximal performance measure than with typical performance. Organ & Ryan (1995) reported substantial correlations between conscientiousness and organizational citizenship behavior. If more research can be accomplished to precisely identify predictor links with individual dimensions of job behavior, the science of personnel selection will be enhanced enormously.

In the last Annual Review chapter on selection, Landy et al (1994) predicted that organizational citizenship, prosocial organizational behavior, and contextual performance would get increased attention as criterion issues. This has occurred. Beyond the studies discussed above, a special issue of the Employee Responsibilities and Rights Journal has several articles about citizenship behavior and its relationship with,

especially, procedural justice and organizational commitment. Finally, and more broadly, we see an important contribution to thinking about expanded criterion domains in Ilgen (1994). Ilgen and colleagues construe jobs in the context of roles that evolve for job holders. These authors' job-role differentiation framework recognizes the importance of social factors in defining "the job." These social factors are likely to introduce contextual-like performance elements into the criterion domain.

We now consider laboratory and field studies that address issues in rater training and the performance judgment process. Regarding rater training, Woehr & Huffcut (1994) conducted a meta-analysis and found that frame-of-reference (FOR) training is overall the most effective rater training treatment. Sulsky & Day (1994) found that FOR training promoted accuracy in performance ratings. However, their results for ratings occurring two days after training suggested that subjects did not recall specific behaviors but instead previously formed impressions of ratees. This in turn suggests that FOR training might not be so useful in helping raters give behavioral feedback to ratees. Lab studies are moving beyond whether FOR and other training treatments "work" to evaluate the information processing mechanisms important for success or failure of rater training programs.

Regarding halo in ratings (i.e. larger than warranted correlations between dimensions), Lance et al (1994) conducted an innovative study comparing causal models representing three different conceptualizations of halo in ratings: 1. General Impression: Overall impression influences ratings on individual dimensions. 2. Salient Dimension: A rating on a single salient dimension influences other dimensional ratings. 3. Inadequate Discrimination: A failure to discriminate between relatively independent dimensions. The first model explained the rating data best, even in situations where the other two types of halo were explicitly encouraged.

Hartel (1993) returned to rating format issues by studying an interaction between rater characteristics and format type. In a lab study, she found that field-independent raters were more accurate than field-dependent raters when a holistic format was employed. Harris (1994) presented a model of supervisory rater motivation in the performance appraisal process. His view is that motivation in this process is a function of both situational (e.g. accountability) and personal (e.g. self-efficacy) factors. Elsewhere, Sanchez & De La Torre (1996) found that observation and evaluation accuracy were related only immediately after viewing performance and only for the components of accuracy involving identification of ratee strengths and weaknesses (i.e. stereotype and differential accuracy). In addition, Ganzach (1995) found evidence of nonlinearity in performance ratings in three field data sets. In particular, the ratings were conjunctive, with negative information influencing the overall performance judgments more than positive information. In a meta-analysis, Viswesvaran et al (1996) estimated the 1-rater interrater reliability of supervisor and peer ratings on 10 dimensions of performance, each at about the same level of specificity as the Campbell et al (1993) taxonomy discussed above. Highlights of the results are: 1. Overall performance interrater reliabilities for supervisors average .52; .42 for peer ratings. 2. Interrater reliabilities for individual dimensions are at about the same level. The latter result is at odds with findings from personality psychology (e.g. Funder 1995) that hypothesize and demonstrate empirically that some traits are more observable and more salient than others, which results in higher interobserver agreement in ratings.

Computerized performance monitoring (CPM) is becoming more common in the communications, banking, insurance, and other industries (e.g. Hedge & Borman 1995). In general, I/O psychologists have used little of their expertise in performance measurement and appraisal to help guide the development, implementation, and evaluation of CPM systems. Exceptions are Kulik & Ambrose (1993), who found in a lab study that raters paid more attention to secretarial performance they actually viewed than CPM information on the same secretaries, and Aiello & Kolb (1995), who found that for high-skill data-entry workers CPM improved performance and that

for low-skill workers CPM led to lower performance. In other developments, Pritchard's Productivity Measurement System (ProMES) has now been used in many settings. An edited book (Pritchard 1995) described successful applications of this method in several manufacturing, service, and other settings. Finally, Quinones et al (1995) showed that work experience is not a unitary concept by demonstrating with meta-analysis that although the overall correlation of experience and job performance is .27, this relationship is significantly higher when experience is defined at the task (rather than the job or organizational) level and as amount (e.g. number of times performed).

PREDICTORS: CONTENT

Abilities and Achievement

COGNITIVE ABILITIES A recently published book, *The Bell Curve* (Herrnstein & Murray 1994), brought a great deal of public attention and debate to the issues surrounding the meaning of intelligence test scores and the nature of general intelligence. The central premise of this book is that individual differences in intelligence have implications for life outcomes and for society as a whole. In an attempt to clarify the issues involved in this debate, the American Psychological Association (APA) assembled a task force to develop an authoritative report on the current status of the relevant scientific findings. The product of this task force was an article in the *American Psychologist* (Neisser et al 1996) reflecting a consensus among many of the leading researchers in the area concerning the nature of general intelligence, subgroup differences, the heritability of intelligence, environmental effects on intelligence, and a variety of related topics. This article is important because discussion generated by *The Bell Curve* seems to "have gone well beyond the scientific findings, making explicit recommendations on various aspects of public policy" (Neisser et al 1996, p. 78).

In the personnel selection arena, the debate concerning the ubiquitousness of the role of general mental ability or *g* in the prediction of training and job performance continues to simmer. Several recent studies have again demonstrated that psychometric *g*, which is generally operationalized as the common variance in a battery of cognitive ability tests (e.g. the first principal component), accounts for the majority of the predictive power in the test battery, and that the remaining variance (often referred to in this research as "specific abilities") accounts for little or no additional variance in the criterion (e.g. Larson & Wolfe 1995, Ree et al 1994b). This line of research also suggests that specific ability components account for somewhat more variance when the criterion is job performance than when it is training performance (e.g. Olea & Ree 1994, Ree et al 1994b), which highlights the importance of the selection of criteria in validation research. Defining *g* statistically using a principal components model is not without its critics. Specific abilities will, by definition, be correlated with the general factor. Thus, it could be argued that it is just as valid to enter specific abilities first and then say that *g* doesn't contribute beyond the prediction found with specific abilities alone (e.g. Murphy 1996b). In fact, Muchinsky (1993) found this to be the case for a sample of manufacturing jobs, where mechanical ability was the single best predictor of performance, and an intelligence test had no incremental validity beyond the mechanical test alone.

While there is a growing consensus concerning the predictive efficiency of *g*, there is less agreement about what this means, especially as it relates to personnel selection practices and research. Some have concluded that "refinements in the measurement of abilities and aptitudes are unlikely to contribute nontrivial increments to validity beyond that which is produced by good measures of general mental ability" (Schmidt 1994, p. 348). Others suggest a variety of scientific and pragmatic reasons why the measurement of specific abilities may still be important and potentially useful. On the scientific side, possibly the most important note of caution is the fact that our understanding of the basic cognitive processes that underlie intelligent behavior and the reasons some people are more able than others is still quite limited (e.g. Murphy 1996b). In addition, an understanding of the processes by which abilities affect performance and the latent structure of the ability-performance

relationships is needed to advance the science of personnel selection (e.g. Bobko 1994).

Specific abilities are likely to be more useful (in addition to or in place of g) when our goal is understanding, rather than just predictive efficiency (e.g. Alderton & Larson 1994, Murphy 1996b). For example, several recent studies have demonstrated meaningful patterns of relationships between specific abilities and criteria. Carretta & Ree (1995) found that different subtests of the Air Force Officer Qualifying Test (AFOQT) were most valid during different phases of pilot training, and for different training criterion measures. Silva & White (1993) found that a language aptitude battery had significant incremental validity beyond general mental ability for predicting success in a language training course. Dror et al (1993) examined differences in spatial ability between pilots and nonpilots and found that pilots were superior in very specific aspects of spatial ability (e.g. mental rotation) rather than in general spatial ability. In addition to the potential for promoting understanding, improved measures of specific abilities and expanded test batteries have also been found to improve the measurement of g (e.g. Larson & Wolfe 1995) which, in turn, may improve validities.

Cognitive psychologists have been studying the nature of intelligence for years, and although their models are just beginning to see application in personnel-related contexts, this sort of theory-based approach clearly has potential for, again, improving our understanding of cognitive ability and of ability-performance relationships. For example, the Air Force is conducting a programmatic research effort to develop and evaluate an ability test battery based on a "consensus information processing model" (Kyllonen 1994). Information is not yet available concerning prediction of training or job performance with these tests, but preliminary results are promising. The internal structure of the test battery is consistent with the information processing model. It has been shown to predict laboratory learning tasks somewhat better than more traditional ability measures, and at least one of these elementary cognitive tasks (working memory) is strongly related to general mental ability. Cognitive psychologists have also identified what appear to be "new" abilities (e.g. time sharing, dynamic spatial ability) that could eventually find selection applications as well (e.g. Jackson et al 1993). One potential concern is that practice and coaching may be more of a problem for the relatively novel tasks included on many of these tests when they are used for selection purposes. Regarding computerized testing more generally, test design issues are discussed by McHenry & Schmitt (1994). In addition, Bennett (1994) provided a review of "constructed" response (i.e. free response) tests that are administered and scored by computer.

Conclusions about the predictive efficiency of specific abilities are very different when the goal is classification rather than simply selection. Zeidner & Johnson (1994) and Scholarios et al (1994) have shown that specific abilities substantially improve classification efficiency, beyond the use of general cognitive ability alone. Using somewhat different procedures, other researchers have confirmed and extended these findings (Abrahams et al 1994, Rosse et al 1995). The amount of gain possible from classification versus selection is negatively related to the intercorrelations among the specific ability tests or composites of tests and positively related to the number of jobs or job families into which applicants are to be classified. However, substantial gains have been found even with predictors (e.g. composites) that are quite highly correlated. These findings are also relevant for vocational/occupational counselors and others concerned with placement (e.g. in the new O*Net), because their decisions are similar to classification decisions in this context.

ACHIEVEMENT We know very little about the nature of specific abilities when they are defined as the variance remaining once a general factor is extracted statistically. It is interesting to note that what little information is available suggests that these "specific ability" components tend to be most strongly related to cognitive ability tests that have a large knowledge component (e.g. aviation information (Olea & Ree 1994)). This is consistent with previous research showing that job knowledge tests tend to be slightly more valid than ability tests (Hunter & Hunter 1984),

and also with research demonstrating that job knowledge appears to mediate the relationship between abilities and job performance (e.g. Borman et al 1993). In a recent meta-analysis, Dye et al (1993) demonstrated the generality of job knowledge tests as predictors of job performance. In addition, they found that the validity of job knowledge tests was moderated by job complexity and by job-test similarity, with validities significantly higher for studies involving high-complexity jobs and those with high job-test similarity. The average corrected validity for job knowledge tests with high job-test similarity was .62 for job performance and .76 for training performance, and this is somewhat higher than the average corrected validity typically found for cognitive ability tests (e.g. .53 (Hunter & Hunter 1984)). Cognitive task analysis--employing protocol analysis to create an elaborated definition of job expertise--may be especially useful for developing job knowledge tests (e.g. DuBois et al 1995).

It might be helpful to discuss research in this area in the context of the distinction between aptitudes and achievement. Briefly, aptitude tests typically draw their items from a wide range of human experience or involve content that is not learned (e.g. reaction time). Achievement tests, however, consist of material that is necessarily more circumscribed. Scores can increase rapidly because of exposure to information from the relevant content area. It is likely that tests of aptitudes and achievement actually fall on a continuum, and these definitions represent the extremes of this continuum. Job knowledge tests are clearly measures of achievement, whereas most cognitive ability tests are near the aptitude extreme of the continuum. Thus, when the content of achievement tests is closely related to the criteria they are used to predict, these tests show greater validity than aptitude measures.

In this context, these results are consistent with research on "tacit knowledge" (i.e. action-oriented knowledge acquired without direct help from others). Tacit-knowledge measures ask respondents to place themselves in a series of job-related situations and then to report what they would or should do. Sternberg and his colleagues have repeatedly found significant validities and some incremental value (over general intelligence) for measures of tacit knowledge in predicting job performance or success (Sternberg et al 1995). Tacit knowledge has been shown to be at least somewhat trainable and to differ according to relevant expertise, which argues for it being placed closer to the achievement end of the aptitude-achievement continuum than more traditional ability tests. Thus, tacit knowledge measures could be viewed as achievement tests with high job-test similarity (and thus high validity). And yet, these measures target knowledge that can arguably be acquired without formal training or job experience (e.g. knowledge related to interpersonal effectiveness). Sternberg characterizes the measured construct as practical intelligence or "street smarts," which is more in concert with the aptitude end of this continuum. It is currently unclear what underlying construct(s) is (are) being measured by these tests. We note that tacit-knowledge measures are very similar to situational judgment tests, described in more detail in the section on "Assessment Centers".

In this same vein, behavioral consistency measures (Wernimont & Campbell 1968) might be viewed as the extreme case of achievement measures with criterion-related content (though there is arguably a motivational component in these measures as well). Hanisch & Hulin (1994) found that a measure of behavioral consistency (operationalized as training performance) significantly increased validity beyond that provided by general ability measures alone for predicting performance on an air traffic control task; however, including ability did not increase validity beyond training performance alone. Using data from the Army's Project A, Campbell et al (1994) demonstrated that both measured abilities and training performance added unique variance to the prediction of future performance. It is not clear why abilities provided incremental validity in the latter research and not in the former, but it is apparent that training performance can increase the validity of ability measures alone in predicting later job performance.

PHYSICAL ABILITIES Although physical ability tests are reported to be

used more widely for selection now than ever before (Hogan & Quigley 1994), not much new information has been published in this area since Landy et al's review. In one recent study, Blakley et al (1994) provided additional evidence that isometric strength tests are valid predictors across a variety of different physically demanding jobs, and also that the prediction of work simulation performance was better than the prediction of supervisory ratings of physical ability. Blakley et al also found, in a large applicant sample, that females scored substantially lower than males on these isometric strength tests. In light of these findings, there is a recent and growing interest in reducing adverse impact through pretest preparation. Hogan & Quigley (1994) demonstrated that participation in a physical training program can improve females' upper body strength and muscular endurance, and that participation in a pretest physical training program was significantly related to the likelihood of passing a firefighter physical ability test.

Personality

Research on personality predictors of job performance continues apace. Evidence mounts that personality predicts job performance (e.g. Barrick & Mount 1991, Hogan et al 1996). One possible reason for the generally positive validity findings can be derived from the results discussed above showing that personality predicts contextual performance (e.g. Motowidlo & Van Scotter 1994). Many of the criteria used in the Barrick & Mount (1991) meta-analysis, for example, were overall job performance ratings, and we have learned that these ratings weight both technical and contextual performance (e.g. Borman et al 1995). Accordingly, the personality measures may be picking up on the contextual component of the criteria. This implies that where the contextual elements of performance can be measured separately, these validities might be higher. A related issue has emerged about whether we learn more about personality-performance links if we use relatively broad traits or narrow traits and if we use general or specific performance constructs. Hough & Schneider (1996) and Schneider & Hough (1995) argued that the Big 5 personality taxonomy (five summary dimensions often identified in factor analyses of personality ratings or self-reports) may be at too coarse a level for use in personnel selection. A nine-factor system was proposed. As evidence that a more fine-grained representation of personality may be useful in prediction, they showed that achievement, which is a more narrow construct than are the Big 5 factors, correlated more highly than did conscientiousness (previously found to correlate the highest of the Big 5 with job performance) with the criteria of overall job performance, job proficiency, training success, educational success, sales effectiveness, and effort. What Hough & Schneider (1996) called compound traits--constructs that don't line up precisely with the Big 5 but which have clear alignment to criterion constructs--are also likely to be useful for selection.

However, Ones & Viswesvaran (1996) argued that broader, rather than narrower, fine-grained personality measures are preferable for use in personnel selection. This is because global measures are likely to be more reliable and job performance criteria are usually complex. They also noted that integrity tests (often a composite of several Big 5 constructs) appear to have higher validity on average than any of the Big 5 traits by themselves (Ones et al 1993). Schneider et al (1996) disputed the Ones & Viswesvaran (1996) conclusion regarding "broader is better." They contended that when strong hypotheses about specific trait-specific criterion links can be made, narrower trait constructs will show better prediction. Hogan & Roberts (1996) provided several examples of narrower personality trait measures predicting specific criteria better than broader such measures. Also, Blake et al (1993) found that some specific scales of the California Psychological Inventory (CPI) predicted overall performance of military academy students (a broad criterion) as well as or better than the more global structural scales, and Powell et al (1995) found that the Big 5 predicted global measures of performance and that more specific facets of these measures predicted more specific dimensions of customer service. Finally, Crant (1995) demonstrated that a relatively specific personality scale predicted real estate sales performance incrementally over measures of the Big 5. As far back as Dunnette (1963), we have believed that the

science of personnel selection is best served by studying links between specific predictor and criterion constructs, so this issue is a very important one. The updated arguments by Campbell (Campbell et al 1993, 1996) are compelling to us. If we are interested in learning more about predictor-performance relations, we need to examine linkages between predictor constructs and different facets of job performance.

There has been considerable recent activity around integrity or honesty testing for selection. PR Sackett & JE Wanek (unpublished manuscript) provide a comprehensive review of issues regarding integrity testing. Of special interest are links between both overt (i.e. direct questions about honesty, integrity, etc) and personality-based integrity tests and the Big 5 personality factors. In an especially useful table, these authors summarize data from Barrick & Mount (1993) and Ones et al (1993) that reveal correlations corrected for attenuation between overt and personality-based integrity tests, the Big 5, and job performance. Meta-analysis results show that on average, overt integrity tests correlate .45 with one another; personality-based tests intercorrelate more highly ($r = .70$ on average). The mean correlation between the two types of integrity tests is .39 (Ones et al 1993). Correlations between overt and personality-based tests and the conscientiousness Big 5 factor are substantial, but so are correlations with the agreeableness and emotional stability factors. Both types of integrity tests correlate .41 with job performance (Ones et al 1993). Conscientiousness and integrity measures, taken together, are likely to produce higher correlations with performance than either one on its own (PR Sackett & JE Wanek, unpublished manuscript). Finally, Murphy (1993) contributed a thorough treatment of honesty in the workplace, including a chapter on integrity testing for personnel selection. In addition, Collins & Schmidt (1993) administered personality, personality-based integrity, and biodata scales to prison inmates incarcerated for white-collar crimes and individuals employed in upper-level positions of authority. Cross-validated discriminant function analysis showed large differences between these two groups, especially on the integrity test, and suggested that "social conscientiousness" best differentiated these groups. Importantly, the criteria used to examine the validity of integrity tests has broadened from theft to a range of counterproductive behaviors including disciplinary actions, accidents, unexcused absences, terminations, drug or alcohol abuse, admissions of wrongdoing, and violence.

The issue of faking or impression management in responding to personality items is of course important in the personnel selection context. Several recent papers confirm that, while slanting of responses occurs in selection settings, validity does not seem to suffer. Barrick & Mount (1996) demonstrated that although self-deception and impression management response distortion of personality items occurred in their sample, validity of the responses was not adversely affected. Christiansen et al (1994) used the 16PF fake good and fake bad scales to correct the scores of assessment center candidates and found that criterion-related validity was unaffected.

Although response distortion does not appear to have a major impact on personality inventory validity in a selection context (e.g. Barrick & Mount 1996), it is still of some concern because these measures are definitely fakeable. One approach to detecting faking when using computerized administration of personality tests is to measure response latencies. Holden & Hibbs (1995) have refined this strategy; the trick is to first correct latencies for both person effects (e.g. slow vs fast readers) and item effects (e.g. longer vs shorter to read). Holden & Hibbs find that these adjusted latency scores can correctly classify about 82% of the test-takers instructed to respond honestly and those told to try to maximize their chances of getting the job. This method deserves more attention. Relatedly, Siem (1996) demonstrated incremental validity in predicting Air Force pilot performance for some MMPI scales when response latencies were incorporated in the scoring system.

Worthwhile for I/O psychologists to be aware of in the personality literature are possible moderators of personality-performance correlations. These include specific personal moderators (e.g. the centrality of a given

trait may vary across individuals), general personal moderators (e.g. low self-monitors are more predictable), situational moderators (e.g. high-autonomy jobs have lower situational strength and thus personality predicts performance better in them), and aptitude by treatment interactions (e.g. the validity of achievement via conformance and independence may be different in high- and low-structure workplaces). Schneider & Hough (1995) provide a nice discussion of these issues for I/O psychologists.

There were several other interesting papers on the topic of personality. Although conscientiousness has been viewed as a consistent predictor of job performance (Barrick & Mount 1991), Hogan & Hogan (1993) demonstrated that this relationship may vary across occupational type, with artistic jobs showing a negative correlation, for example. Schmit et al (1995), in a study with college students found that providing an "at work" context for personality test items improved the predictive validity of their conscientiousness scale against a criterion of GPA and did not alter the factor structure of the inventory scores. McDaniel & Frei (1994) conducted a meta-analysis of customer service predictor validities and found a corrected mean validity of .49 based on 49 correlations and an N of 6441. Virtually every study of personality in a selection context has used self-reports to measure personality constructs. However, Mount et al (1994) found that observer ratings (i.e. supervisor, peer, and customer) of Big 5 personality constructs added to the prediction of job performance beyond self-reports alone. Finally, Hogan & Blake (1996) argued that vocational interests are meaningfully related to personality and urged that vocational psychology's taxonomic schemes be considered in studying links between individual differences in personality and work outcomes, including performance (but see Schmidt 1994).

PREDICTORS: PROCESS

Assessment Centers

The assessment center (AC) continues to be popular in US organizations and elsewhere. For example, Payne et al (1992) report a threefold increase (1985-1990) in the use of ACs for managerial selection in the United Kingdom. However, published literature on ACs has dropped off. We believe this is because: (a) the predictive validity of ACs is now largely assumed, and (b) there is less hope and enthusiasm for finding a way to establish their internal construct validity. Regarding the latter point, the consistent finding has been that exercise rather than trait factors emerge from factor analyses of AC ratings. This is important if we are using ACs for developmental purposes. Feedback to participants on dimensions that are not rated reliably across exercises cannot be easily justified.

At any rate, there have been a few interesting studies on ACs. Henderson et al (1995) developed an AC in the United Kingdom focused on tapping competencies likely to be important in future business settings. Ryan et al (1995) had college students view performance in an AC exercise either in vivo, videotaped, or videotaped with an opportunity to pause and rewind. Observation accuracy was somewhat better in the latter condition, but no significant differences were found for evaluation accuracy.

An important trend in organizations using or interested in using assessment for selection or promotion is to streamline those assessments. Employing fewer exercises or assessors, reducing exercise length, reinventing the consensus meeting process, etc, are given increasingly serious consideration as companies struggle to reduce costs in human resources practices and elsewhere. "Low fidelity" assessment or situational judgment tests (SJTs) can be viewed as a rather extreme attempt to streamline ACs. As mentioned above, SJTs generally present difficult but realistic situations job incumbents might face and ask what the testee would or should do in each situation. Often SJTs have a multiple-choice format, and testee responses are scored against expert judgments of each response option's level of effectiveness (e.g. Motowidlo & Tippins 1993).

These tests are not new (e.g. File 1945), but they have recently become more popular. Further, SJTs have been successful in predicting job performance (e.g. Motowidlo & Tippins 1993) and attrition (e.g. Dalessio 1994). An obvious inherent limitation of SJTs is that they probably do not measure can-do or will-do performance but should-do performance and are

thus more similar to achievement or job knowledge tests (see the section on "Abilities and Achievement"). Nonetheless, Kerr (1995) and Sternberg et al (1995) reported correlations of about .30 and .60, respectively, between business tacit knowledge test scores and AC ratings. In addition, video-based SJTs (e.g. Drasgow, unpublished working paper 1993) may reduce the fidelity deficit somewhat. Our view is that more research is needed on what SJTs are actually measuring, similar to what has been called for regarding ACs (e.g. Klimoski & Brickner 1987).

Interviews

Much continues to be written about the interview and its validity. Most notable are reviews that supplement previous meta-analytic work, and discussions surrounding the interaction between structure in the interview and the interview's purpose. We group relevant research into five major thematic areas.

First, additional quantitative and qualitative reviews of interview reliability and validity have been conducted. Huffcutt & Arthur (1994) revisited the Hunter & Hunter (1984) meta-analysis to assess interview validity compared with that of ability tests. By recategorizing interview studies according to level of structure, the authors found that interview validities increased as structure increased, with the top two levels of structure comparable to validities found by Hunter & Hunter for ability tests. A meta-analysis of interview reliabilities (Conway et al 1995) showed that interrater reliability levels are higher when interviews incorporate multiple ratings, interviewer training, and standardization of questions and response evaluation. Such reviews continue to supply optimism for, and guidance concerning, use of the interview as a selection tool.

A second area of research encompasses what Dipboye & Gaugler (1993) referred to as the cognitive and behavioral processes in the interview. Most of these studies isolate a particular variable or two, in the interview process and attempt to determine the impact on the outcome of the interview. For example, Williams et al (1993) found that preinterview impressions had their greatest effect when applicants' interview performance was average; high performers' ratings were slightly affected by negative preimpressions, while low performers were rated low regardless of the preimpressions. Stevens & Kristof (1995) found that applicants' impression management tactics significantly predicted interviewers' evaluations, and applicants seemed to use more self-promotion tactics than ingratiation tactics. Dalessio & Silverhart (1994) suggested that interviewers may not give much weight to candidate performance in the interview if they are aware of high biographical test score data, but they will place more credence on interview performance if biodata information is less supportive of a decision to hire. In an intriguing study, Motowidlo & Burnett (1995) demonstrated that raters who watched videotaped interviews with no sound provided reasonably valid ratings, that interviewers do rely on visual cues even when aural cues are present, and that aural and visual cues are somewhat redundant. Pulakos et al (1996) examined individual differences in interviewer ratings and found no support for the hypothesis that systematic interviewer errors will attenuate interview validity when data are aggregated across interviewers. In addition, consensus ratings were shown to have slightly higher validities than averaged ratings. Howard & Ferris (1996) examined the social and situational context of employment interview decisions using structural equation modeling. They found that high levels of appropriate nonverbal behavior (i.e. smiling, nodding, eye contact) by applicants increased interviewers' ratings of their competence. In addition, more highly trained interviewers perceived self-promoting applicants as less competent than did interviewers with less training. More expansive, model-based studies like this one will help to advance current knowledge about the interview process.

A third major area involves comparison of interview techniques, primarily future-oriented (e.g. situational) and past-oriented (e.g. behavior description) interviews. Campion et al (1994) reported higher validities for past-oriented (.51) than future-oriented interviews (.39). In addition, when ratings from both types of questions were regressed against job performance, past questions showed incremental validity over future questions, but not vice versa. Pulakos & Schmitt (1995), using

professional government employees as subjects, compared situational versus past behavior questions in a structured interview and found that only the past behavior questions were valid in predicting supervisor ratings. Using a group of French- and English-speaking Canadian managers, Latham & Skarlicki (1996) demonstrated that both the situational and behavior description interviews were resistant to same-race bias (e.g. in-group favoritism, out-group discrimination), while the conventional interview was not. It seems well established now that structured interviews are more valid than their unstructured counterparts for predicting job performance. About the question of what kind of structured interview is more valid, the advantage presently goes to the behavior description procedure. We are likely to see more comparison studies in the future.

A fourth area involves a broad examination of constructs underlying the interview. Sue-Chan et al (1995) administered the Wonderlic Personnel Test, a tacit knowledge test, a measure of self-efficacy, and an interview to undergraduate nursing students. Neither the situational nor patterned interview correlated significantly with the cognitive or tacit knowledge tests but both did so with the self-efficacy measure. In addition, the situational interview showed incremental validity beyond the cognitive test, using grade-point average as the criterion. Campion et al (1994) investigated the notion that a structured interview has incremental validity over a battery of cognitive ability tests and found that the interview correlated .60 with the battery of tests, but showed incremental validity when regressed against job performance ratings. We echo Landy et al's (1994) endorsement of continued emphasis on examining the nomological network around interview judgments.

The fifth and final area involves a debate, sometimes heated, about what the true purpose of the interview should be. Herriot (1993) proposed that the interview's focus should reflect a dynamic interpersonal process, rather than the prevalent psychometric perspective. Herriot characterizes the latter as academic, while the former is seen as more practitioner oriented, and therefore more useful to organizations. In related work, Adams et al (1994) emphasized the importance of the interview from something other than a "prediction-of-performance" view, stressing its usefulness for assessing applicant-organization fit. A similar theme was sounded earlier by Anderson (1992), who reviewed and categorized eight decades of interview research into objectivist-psychometric and subjectivist-social perception perspectives. Howard & Ferris (1996) stressed this theme when they suggested interviewer training that considers the context of the organization might help interviewers better gauge whether applicants will be successful in the organization. This notion of organizational fit was also discussed by Latham & Skarlicki (1995), who investigated the criterion-related validity of the situational and patterned interview using organizational citizenship behavior as the criterion. They found that the situational interview predicted citizenship behavior and concluded that extra-role behavior can indeed be predicted with an interview format.

Finally, in an excellent review of the interview literature, Dipboye (1994) cited reasons why structured procedures show greater validities than unstructured procedures. He also discussed why unstructured interviews continue to be used, including: 1. Recruitment (in addition to selection) is often a concern. 2. More interviewer autonomy and self-expression is possible. 3. Chances for a good fit between hires and the context of the job are improved. Dipboye (1994) argued that we need more dynamic models of employee selection in which the interview maintains structure in the assessment of applicants while fulfilling other functions such as evaluating fit to the organization. Such an approach suggests broadening the attributes that are assessed to include personality characteristics, personal values, and the like, attributes relatively neglected in the current structured interview approaches.

Biodata

In the two preceding Annual Reviews of personnel selection (Landy et al 1994, Schmidt et al 1992), the authors emphasized the importance of increased attention to theory and to the constructs being measured in biodata research, development, and application. Three documents published

in the period covered by this review suggest movement in that direction. First, publication of the Biodata Handbook by Stokes et al (1994) provides coverage of job analysis, item development, scoring, validation, legal issues, theories, and applications. As Dunnette (1994) noted in his foreword, "publication of the Biodata Handbook marks a juncture, serving not only to outline current knowledge of the practical and scientific bases of biographical information, but also to provide a framework for extending our knowledge substantially in the years to come" (p. xi).

A second source for biodata information can be found in Trent & Laurence (1993), a monograph for the Department of Defense examining adaptability screening for the Armed Forces. The monograph provides a good overview of the social, political, and technical issues surrounding use of biodata in the military. In a third volume, edited by Rumsey et al (1994), Mael (1994) discussed approaches to biographical data, especially related to how they are viewed from a legal perspective. In the same volume, Schmidt (1994) provided insightful comments about biodata theory and practice. These three edited pieces portend an increasing emphasis on biodata in the years ahead. Elsewhere, Brown & Campion (1994) found that recruiters perceive both cognitive and noncognitive information in biodata, and each can be interpreted quite reliably. In addition, Mael & Ashforth (1995) suggested that biodata may capture dispositional elements associated with person-organization fit, internal cultural socialization, preference for group attachments, and achievement-oriented pursuits.

Applicant Reactions

Landy et al (1994) referred to the history of personnel selection as pre-Copernican in that the center of the universe with respect to selection has been the needs and goals of the user (i.e. the employer). This is changing, with continued interest in applicant reactions to selection procedures, the "social side" of selection. First, why might applicant reactions to selection procedures be important to study? Smither et al (1993) and Rynes (1993) provided good responses to this question. Beyond what some would see as a moral imperative to become involved with applicants' concerns: 1. Organizational attractiveness to applicants is growing in importance because organizations increasingly see them as customers to be satisfied in the applicant-employer relationship. 2. There is increased potential for unpopular or controversial selection procedures to lead to lawsuits against the organization. 3. Negative applicant reactions may indirectly affect the validity of a selection procedure.

The most straightforward way to study this topic is to ask applicants essentially how they feel about each type of selection test or procedure. For example, Rynes & Connerley (1993) surveyed job seekers about their general reactions to 13 different selection procedures. Most popular were simulations and tests with business-related content. Least popular were personality, honesty, and drug testing. Kluger & Rothstein (1993) found that business student subjects were more comfortable with a biographical inventory than with an ability test in that they viewed themselves as having more control over their performance, thought it was fairer and less difficult, and believed the test better captured "who they were." Rosse et al (1994) found that, in general, relatively concrete and more obviously job-related predictors are seen as fairer in a selection setting. However, Tepper (1994) demonstrated the danger of using lab research to study attitudes toward selection procedures. Subjects in a lab setting rated favorably drug testing for safety-sensitive occupations, whereas individuals actually tested for drugs in these occupations had more negative attitudes.

Rynes (1993) provided an excellent overview of the early research on applicant reactions. She focused on how applicant attitudes toward organizations are influenced by selection practices and how those attitudes may affect applicant behaviors, job-choice decisions, and early expectations as a job incumbent. Her position is that this area of study will become more important as drug and integrity testing, background checks, and personality assessment become more popular. Rynes calls for more qualitative research (e.g. protocol analysis and other direct process-oriented methods) to better frame the process of responding to selection practices.

A path to get beyond individual studies of best- and least-liked selection procedures is to develop a framework related to social issues involved in the selection process. Two kinds of models have recently emerged. Schuler (1993) and Arvey & Sackett (1993) provided listings of possible determinants of fairness perceptions. Gilliland (1993) presented a model of reactions that depicts the situational and personal conditions that influence how procedural and distributive justice rules are judged to be satisfied (or violated). Conditions include job relatedness and consistency of the selection procedures, opportunity for two-way communication with company representatives and to be reconsidered if rejected, feedback about test performance, and the propriety/invasiveness of questions.

Macan et al (1994) and Smither et al (1993) found, somewhat counterintuitively, that applicant reactions to selection procedures are unrelated to how well they do in the process. Macan et al also showed that although perceptions of the tests (an ability test and assessment center) were important in influencing job acceptance intentions, overall impressions of the work and organization were even more important. Applicant reactions to selection procedures should continue to be an important area of study. Research will be most useful when rooted in organizational justice theories (e.g. Gilliland 1994).

VALIDITY AND UTILITY

Models of Validity

As we go to press, a distinguished panel of psychologists and educational experts is finishing a draft of the Standards for Psychological and Educational Testing. This document is being prepared with support from (and under the scrutiny of) the American Psychological Association, the American Educational Research Association, and the National Council on Measurement and Evaluation. A very important element of the Standards will be their treatment of the concept of validity. In the literature, validity has been increasingly discussed as a unified concept (e.g. Messick 1995) rather than as composed of various categories (e.g. content validity, criterion-related validity). A key but controversial aspect of Messick's definition of construct validity is the incorporation of consequences. Messick argues convincingly that the meaning of test scores can only be interpreted in the context in which they are used. Others (e.g. Brown 1994; Tenopyr, unpublished working paper) have expressed concern that endorsement of "consequential validity," especially in the new Standards, is likely to be abused and misinterpreted by those opposed to testing, most notably in the education arena where the multiple-choice test is currently in disfavor. Smith (1994) has proposed a theory that attempts to explain relationships between the content of selection measures and their relationships with job performance. He distinguishes between universals (characteristics required for success in virtually all jobs) and occupationals (characteristics required for a subset of jobs or a single job). The third aspect of test content, "relationals," is focused on characteristics required for person-organization fit (discussed elsewhere).

Meta-Analysis and Validity Generalization

Numerous meta-analyses addressing a variety of important questions have been published during the period covered by this review. Allen & Preiss (1993) discussed the "necessary and symbiotic relationship between meta-analysis and replication research" (p. 9), with replication providing the input to meta-analysis and meta-analysis providing the direction for future research. In related work, Murphy (1994a) discussed the importance of the quality of the research that is included in meta-analyses. For example, the average size of the individual samples included in meta-analyses and the quality of the criterion measures used are directly related to the power of meta-analyses to detect moderator effects. Sagie & Koslowsky (1993) demonstrated that meta-analytic techniques have limited power to detect moderators, especially if the moderator effects are relatively small. Since individual studies lack power to detect moderators as well (see section on "Statistical and Measurement Issues"), this is particularly disheartening.

There have been a number of methodological advances in meta-analysis, and some of these advances have implications for conclusions drawn based on

past meta-analyses. Law et al (1994) demonstrated that recent refinements in the Hunter et al (1982) procedures do, in fact, increase the accuracy of results. Vevea et al (1993) developed procedures for identifying and assessing bias in the selection of studies to be included in meta-analyses and used these procedures to demonstrate that selection bias does not appear to affect conclusions drawn in previous meta-analyses of GATB validities. Using a Monte Carlo approach, Koslowsky & Sagie (1994) provided information about the relative proportions of true and artifactual variance in meta-analyses under a variety of conditions. In general, sampling error (not unexpectedly) accounted for most artifactual variance, and commonly used corrections for range restriction decreased the proportion of artifactual variance more than corrections for measurement error. Huffcutt & Arthur (1995) developed a statistic appropriate for detecting outliers in meta-analyses and demonstrated that, in their meta-analysis, the removal of outliers helped clarify what had been a confusing meta-analytic result.

In perhaps the most exciting potential methodological advance in this area, Viswesvaran & Ones (1995) discussed procedures for using meta-analytically derived matrices of estimated true score correlations as the input for structural modeling. This allows for large-scale theory testing, even when all of the relevant variables and relationships have not been included in each study. Variations on this approach have already been used in a handful of studies, but a great deal of work is needed on the assumptions and calculations involved before widespread application is prudent. For example, the use of correlations as opposed to covariance matrices in these analyses may be problematic.

Selection Utility

Utility researchers continue to battle with the problems involved in estimating key parameters included in traditional utility models, most notably the standard deviation of performance in dollars (SDy). While additional approaches have been proposed, there is little consensus concerning the proper measurement methods (e.g. Cesare et al 1994, Raju et al 1993). Another problem that continues to plague this area is the lack of interest managers and other decision makers have in the results of utility analyses. In fact, Latham & Whyte (1994) found that managers expressed less support for implementing a valid selection procedure when they were presented with utility information than they did when they were presented with validity information only. Because the primary purpose of utility analysis is to communicate the value of human resource management systems to managers, these troubling results have stimulated a good deal of discussion. Some have suggested that research is needed regarding how managers actually make selection decisions and what types of information they might find useful (e.g. Boudreau et al 1994).

Another approach to this problem has been to expand the concept of utility to make the results more relevant to managers' and decision makers' needs. Some simplifying assumptions made in traditional utility analyses have been called into question, and models have been proposed that attempt to more accurately reflect organizational realities. Boudreau et al (1994) suggested that utility models should consider: (a) the fact that performance is multidimensional, (b) that predictors are typically added to existing selections systems rather than replacing them, and (c) that organizations often do not use optimal top-down selection. Boudreau et al also pointed out that individuals' value to the organization may go beyond their current performance in a particular job, which suggests that utility analyses may be improved by incorporating considerations of person-organization fit. Russell et al (1993) further suggested that utility analyses need to reflect the strategic context faced by managerial decision makers, where profit maximization may be only one of many strategic objectives, and maximizing performance is only one of several possible goals in selection. Russell et al also suggested that many of the variables relevant to utility estimation can change over time (e.g. strategic needs, predictor-criterion relationships), and thus it is likely that utility will need to be periodically reassessed. Costs not traditionally included in utility analyses have also been incorporated, such as recruitment costs (Law & Myers 1993) and legal exposure (Roth 1994).

STATISTICAL AND MEASUREMENT ISSUES

There has been increasing endorsement of the notion that validation is an estimation problem, and we see commensurate interest in improving the available procedures for providing more accurate estimates. Regarding corrections for restriction in range, Held & Foley (1994) provided an assessment of the relative accuracy of univariate and multivariate corrections in a variety of situations. Abrahams et al (1993) demonstrated that validities are severely underestimated when criterion data are unavailable for the lower performing portion of the sample due to failure, resignation, or dismissal; and they demonstrated the effectiveness of a new procedure for more accurately estimating validities in these cases.

Unfortunately, a relatively small proportion (4%) of validity studies actually employ range restriction corrections (Ree et al 1994a). One major obstacle to the use of range restriction corrections in applied settings is the fact that estimates of predictor variance in the unrestricted (i.e. applicant) sample are often not available. Hoffman (1995) provided some support for using published norms to make these corrections, by demonstrating their consistency with empirical results. However, Sackett & Ostgard (1994) used a large sample of data (but only a single test, the Wonderlic Personnel Test) to demonstrate that job-specific applicant pools have smaller standard deviations than the national norms, especially for complex jobs. They recommend considering these differences when using published norms to make corrections.

The detection of variables that moderate validity and the psychometric issues involved have received much recent research attention. One important finding in this area is the alarming lack of power most statistical procedures have for detecting existing moderators. Aguinis (1995) provided a summary of the issues and recent progress in this area. Research has generally shown that moderated multiple regression (MMR) is the most powerful procedure for the detection of moderators. Factors influencing the power of MMR include the distributions of variables (e.g. restriction in range), measurement error, "coarseness" of the variables, the true effect size, and (obviously) sample size. Worse yet, many of these effects are actually interactive, which results in very low power in many common situations. This literature suggests that conclusions concerning the absence of a significant moderator variable should be drawn cautiously, and power to assess moderators should be assessed whenever possible. Suggestions for addressing these problems in future research include basing the search for moderator variables on sound substantive theories, paying more attention to the dependent variables (Bobko & Russell 1994), and using structural modeling to address measurement error problems (for an example, see Jaccard & Wan 1995).

There has been somewhat of an explosion in the use of structural modeling analyses in a variety of areas of psychology, including personnel psychology (Stone-Romero et al 1995). Uses have included assessing the effects of method variance (Schmitt et al 1995, Williams & Anderson 1994), exploring the relative accuracy of different response scales (Chang 1994), and modeling the structure of performance (Hanson et al 1993). These studies illustrate the potential of structural modeling to untangle error and true score variance to more directly assess underlying relationships.

Computer programs for fitting structural equation models to the data and estimating model fit are becoming more readily available and user friendly. There have also been many improvements in the available measures of model fit, as well as improvements in model testing procedures. Medsker et al (1994) provided an excellent summary of this rapidly progressing area. These authors also reviewed applications of structural equation modeling in recent studies and noted that while there have been some improvements in the procedures used, current practices have not kept up with methodological advances. It is worth noting that some are critical of structural modeling techniques and the potential of this approach for advancing our field (e.g. Brannick 1995), but others argue that many of the identified shortcomings reflect deficiencies in applications of structural modeling and not the approach itself (e.g. Williams 1995).

A few miscellaneous statistical and measurement developments also deserve mention. Sidick et al (1994) found that a three-alternative

multiple-choice test had psychometric properties similar to those of five-alternative tests, confirming and extending similar work in the education arena. Three-alternative tests take less time to develop and to administer, so this finding could enhance efficiency a great deal. White et al (1993) reviewed recent advances in log-linear modeling and described how these procedures can be used to obtain more information concerning categorical and nominal variables than is provided by more traditional approaches (e.g. chi-square tests).

There have been several recent attacks on traditional significance testing, highlighting the deficiencies of null hypothesis testing (Cohen 1994, Schmidt 1996). Although some of the criticisms are not new, the pervasiveness of reliance on significance testing indicates that they may still be warranted. A particularly serious problem occurs when exclusive reliance is placed on significance testing in studies with low power. Recommended alternatives are point estimates and confidence intervals, with results across studies combined using meta-analytic procedures. However, confidence intervals for even relatively simple statistical estimates can be fairly complex (for some very useful examples, see Olkin & Finn 1995), with confidence intervals for more complex multivariate procedures difficult or impossible to conceptualize or calculate. While Schmidt's proposal to abandon significance testing may be controversial, the merits of reducing the role of significance testing are more widely accepted.

One somewhat unfortunate theme emerging in this literature is that there are many improvements in statistical procedures available for use in selection research, but researchers are slow to adopt these improvements. This could be because statistical procedures are becoming unwieldy in their complexity. Keeping up with the state of the art in the wide variety of multivariate procedures that have become so integral to our field (e.g. meta-analysis, structural modeling) is rapidly becoming a full-time job. Perhaps future research will more often require collaboration with statistical or measurement specialists who can provide the insight needed to use these powerful procedures appropriately and with maximum benefit.

EQUAL EMPLOYMENT OPPORTUNITY AND LEGAL ISSUES

Recent activities on the legal and legislative fronts provide clear focal points for research and, especially, practice activities. Within the past several years, the National Academy of Science's (NAS's) report on Fairness in Employment Testing, the Civil Rights Act (CRA) of 1991, and the 1990 Americans with Disabilities Act (ADA), have fueled renewed and increased scrutiny of industrial/organizational psychology science and practice.

Sackett & Wilk (1994) provided an excellent in-depth discussion of score adjustment (e.g. according to race or gender) in preemployment testing, reviewing the legal environment for personnel selection surrounding passage of the CRA of 1991, as well as the background, rationale, and consequences of score adjustment. These authors also provide a review of group differences and their relationships to job performance for cognitive ability, personality and physical ability tests, biodata, and interest inventories. A second article in the same issue of the *American Psychologist*, by Gottfredson (1994), discusses within-group norming in the context of what she calls "politically selective science." She calls for the addition of noncognitive tests to cognitive test batteries to help reduce adverse impact but notes that this strategy is most likely to provide little help with cognitively complex jobs. Kehoe & Tenopir (1994) summarized the literature on group differences, types of adjustment strategies, and evaluation of these adjustment strategies. Finally, Varca & Pattison (1993) reviewed recent employment discrimination litigation to examine changing interpretations of evidentiary standards (i.e. causation, burden of proof, and business necessity) and concluded that currently only the burden of proof standard is clear cut (it rests with the defendant); and Ledvinka (1995) discussed the CRA of 1991, the ADA, and recent antitesting initiatives (e.g. *Soroka v. Dayton-Hudson Corporation*) within the context of government regulatory activity.

A more specialized debate has evolved concerning the use of banding as a method of score adjustment. Banding involves defining a range of scores that will be treated as if they were equivalent; the width of this

range is determined by the reliability and standard error of measurement. In fact, Murphy (1994b) suggested that when tests of moderate to low reliability are used, banding may lead to treatment of many applicants as statistically indistinguishable. Essentially, tests with high reliability work against achieving diversity with a banding approach! In 1994, the Scientific Affairs Committee of the Society for Industrial and Organizational Psychology released a report on banding, examining the rationale, methods, and implications of banding procedures. The committee concluded that general research on banding systems highlights a number of issues that must be considered in evaluating specific strategies, but it does not necessarily resolve policy debates that surround banding. The decision to use or reject banding in specific circumstances requires a careful evaluation of its costs and benefits.

Murphy et al (1995) examined separate and joint effects of several selection system characteristics (e.g. selection ratio, reliability, preferential hiring) and applicant pool characteristics (e.g. proportion with lower scores, mean differences between subgroups) on selection outcomes under banding. They suggest that the single best strategy for increasing the proportion hired from a lower scoring group is to change the applicant pool, rather than modify the selection system. Schmidt & Hunter (1995) argued that the statistical rationale for banding, and the operational banding procedure itself, are inconsistent and that the latter is used by advocates to mask minority preference rules. Siskin (1995) presented a mathematical model that includes the expected difference in performance between the top-ranked and bottom-ranked person in the band, and the likelihood that the top-ranked person will actually outperform the bottom-ranked person. Siskin argues that the results support the use of banding, and he suggests that the social gains of banding may be greater than the economic cost. In a chapter on personnel selection in *The Changing Nature of Work* (Howard 1995), Landy et al (1995) discussed the sliding band approach and pointed out that the best estimate of a candidate's true score on a test is still the observed score, regardless of the standard error; the rebuttal is that some modest precision might be sacrificed to realize the social goal of workforce diversity. The use of banding as a viable score adjustment approach is sure to be debated further in the literature and in the courts.

The ADA of 1990 generated much discussion about the disabilities covered and what constitutes a "medical test." Working definitions should continue to evolve based on administrative guidelines and relevant case law. Klimoski & Palmer (1993) reviewed the ADA with regard to the recruitment and assessment of job applicants and provided a discussion of issues and concerns from both the applicant and employer perspective. Fischer (1994) and Pati & Bailey (1995) summarized the ADA and discussed its practical implications related to measurement issues and organizational practices.

Although previous studies have shown age to be a poor predictor of performance, age stereotypes continue to prevail in the workforce. Finklestein et al (1995) reviewed the existing studies of age discrimination in simulated employment settings, identified situational characteristics that might contribute to this type of discrimination in employment-related decisions, and developed a conceptual framework for studying age discrimination. They also conducted a meta-analysis of lab study findings and found that older workers were rated as less favorable when research participants were younger workers and when no job-relevant information was provided.

Regarding practice issues, Pulakos & Schmitt (1996) examined two strategies for reducing adverse impact in a federal investigative job and found increases in criterion-related validity and decreases in subgroup differences when a paper-and-pencil verbal ability measure was supplemented with a situational judgment test, a biodata measure, and a structured interview. Lefkowitz (1994) found a significant pattern of assigning new clerical employees at a large commercial bank to supervisors of the same ethnic group; likewise, later reassignment increased the percentage of organizational "ethnic drift" toward same-race supervisor-subordinate dyads. Finally, Gutman (1993) published a book on EEO law covering current

employment issues such as Title VII of the CRA of 1964, the CRA of 1991, the ADEA, and the ADA, with an emphasis on the pragmatic implications of such issues for human resources practitioners. The current litigious nature of our society suggests that legal issues will continue to play an important role in selection research and practice in the years ahead; few topics in our field provide such polarized points of view.

SELECTION FOR WORK GROUPS

The use of groups to accomplish work tasks is enormously popular in a wide variety of organizations. Research concerning the nature of work groups and work group effectiveness continues to accumulate at an accelerating pace (e.g. Guzzo & Salas 1995, Salas et al 1995). Work groups serve a variety of purposes and take on a variety of different forms, and Klimoski & Jones (1995) make a strong case that different types of work groups have different knowledge, skill, and ability (KSA) requirements. One type of work group that has received a good deal of research attention, mostly in the military, is the "team," which has been defined as including, at a minimum, two people, a common goal, specific role assignments, and interdependence of members. Important themes in the research on teams include uncovering the behavioral correlates of effective teamwork and developing measures of team performance (Sales et al 1995). Results of this research provide a great deal of information regarding characteristics needed in effective team members.

Stevens & Campion (1994) reviewed the literature on work groups and provided a discussion of the potential KSA requirements for teamwork and the implications of these teamwork KSAs for selecting group members. Not surprisingly, interpersonal skills consistently emerge as important for working in groups. These include conflict management and resolution, collaborative problem solving, and communication. Hogan & Lock (1995) pointed to the current lack of empirical information concerning the interpersonal skills needed in the workplace and developed a taxonomy of these skills using the critical incident technique. Stevens & Campion suggest that interviews, assessment centers, and biodata might be appropriate for tapping such KSAs, and they demonstrate that a situational judgment type measure can also be useful in selecting work group members. In addition, work group members are often required to have broader skill sets than individuals who work more independently. Frequently work group members are expected or required to know aspects of one another's jobs in order to facilitate coordination and communication or to provide backup for other group members (Sales et al 1995).

The issues involved in staffing work groups take on another level of complexity when we consider the mix of people within each work group. Past research has yielded equivocal results concerning the effects of work group heterogeneity on performance. A model recently developed by Jackson et al (1995) attempts to describe how work group diversity impacts on performance and to integrate research findings in this area. One important point in this regard is that the type of diversity is very important, not just its presence or absence. Work group diversity has been discussed in the past as if it were a unitary concept, when in fact groups can be diverse in terms of member abilities, skills, knowledge, demographics, personality, and so on. Klimoski & Jones (1995) discussed the importance of having the correct mix of people in work groups, and suggested taking group norms into account when selecting people to join an existing team. Research in this area is still a long way from realizing the potential payoff Landy et al (1994) suggested was possible, but there has been a great deal of progress made toward understanding work groups and some preliminary attempts to apply this understanding to selection and staffing issues.

PERSON-ORGANIZATION FIT

The past few years have seen a surge of interest in person-organization (P-O) fit research and thinking. The basic notion here is that a fit between personal attributes and characteristics of the target organization contributes to important individual and organizational outcomes. Kristof (1996) noted, however, that there is considerable confusion about what P-O fit is. For example, P-O congruence is sometimes equated with person-environment fit, where the latter also encompasses person-vocation and person-job fit. In addition, researchers have studied

direct judgments of perceived fit (e.g. interviewers' perceptions of applicant fit) and indirect measures of actual fit (e.g. the fit between independent judgments of individual and organizational characteristics). Kristof provided a very useful overview of current progress and problems in P-O congruence research. Overall, Schneider's work on the attraction-selection-attrition (ASA) model is perhaps most noteworthy in this area. Schneider et al (1996) provided an update of ASA research. The ASA framework suggests a different way of viewing personnel selection, at the organizational rather than individual effectiveness level. This approach has evolved over the years, and Schneider et al now argue that homogeneity in organizations (e.g. in personality, attitudes, and values) is probably good early in the life of organizations because it contributes to enhanced cooperation and communication; however, such homogeneity may later lead to inflexibility and difficulty adapting to changing external environments. Related to this view, Ostroff (1993) found that high schools where there was an overall good fit between organizational climate and teachers' personalities tended to be more effective as organizations, though the N was quite small (N = 29). In addition, the relationship was reversed for the climate dimensions of structure and hierarchy, which suggests that lack of congruence in some areas might be important for organizational effectiveness.

One aspect of the ASA argument is the "gravitational hypothesis" that persons in the work force will over time sort themselves into jobs that are compatible with their interests, values, etc. Wilk et al (1995) tested this hypothesis and found that general cognitive ability predicted whether workers moved to higher or lower complexity jobs over a five-year period, and that longer-term employees in jobs are somewhat more homogenous in ability compared with shorter-tenured employees. Lancaster et al (1994) found that, in an employment agency setting, persons with similar abilities and vocational interests tended to apply for similar jobs, but this was not true for personality. The authors speculate that ability and vocational interest requirements are relatively homogenous for jobs, whereas personality may be more of a P-O fit variable.

Two studies used a forced-choice test format to select for fit. Villanova et al (1994) developed a job compatibility test for selecting motion-picture theater workers. With a predictive validity design, they found significant correlations with job performance and turnover. Barrett (1995) reported research on an instrument that has as items performance requirements for the target job that applicants rate according to importance. Supervisors provide Q-sort ratings of each one's "actual" importance and applicant-supervisor fit is evaluated. Concurrent and predictive validities are mostly in the 30s and higher.

Adkins et al (1994) found that recruiters' assessments of P-O fit in work values are somewhat idiosyncratic and better aligned with the fit between recruiter and interviewee work values. Further, recruiter judgments of P-O fit did not predict their ratings of employability. In an interesting study, Gustafson & Mumford (1995) found that patterns of personality scores used to form homogenous groups were related to job satisfaction and performance, but importantly, the influence of personality type on these outcomes was enhanced when type of work situation was taken into account, supporting a P-O fit interpretation. Cable & Judge (1994) showed that characteristics of compensation systems had a main effect on pay preferences but that fit between individuals' personality and pay system characteristics enhanced the prediction of pay preferences and job attractiveness. In a lab study, Bretz & Judge (1994) studied the impact of various organizational characteristics such as group-based reward systems and procedural justice policies on the dependent variable of whether students would accept a job offer from each of the hypothetical organizations. Most important, interactions were found demonstrating support for the hypothesis that human resource system characteristics may be most influential regarding job choice when considered in the context of P-O fit. Edwards (1994) provided a major methodological criticism of congruence indices that most P-O fit research employs. A polynomial regression approach is proposed to overcome these problems.

In other studies, Spector et al (1995) found in a sample of civil

service employees that two personality traits--anxiety and optimism--correlated significantly with several job characteristics (e.g. autonomy, variety) describing these persons' job. Finally, Day & Bedeian (1995) found that similarity between the personality of individuals and others in the organization predicted job performance. These authors call for a test of the predictive power of the traditional selection model matching applicant attributes with job performance requirements to this congruence model matching applicant attributes with the attributes of organizations or their members. Designing a fair test of these models will not be easy, but it is reasonable to ask the question of how well the P-O congruence model predicts performance and perhaps other important outcome variables compared with the person-job requirement fit model that has been our standard methodology. Importantly, the end-of-jobs (e.g. Bridges 1994) and competency-based-organizations (e.g. Lawler 1994) view of the future argues for increased use of the P-O model for selection. As organizational flexibility in effectively utilizing employees increasingly becomes an issue (e.g. workers are more often moved from job to job in the organization), the P-O model may be more relevant in comparison with the traditional person job match approach (e.g. Kristof 1996). Our view is that both models will be useful and may productively be employed in concert.

SUMMARY OF MAJOR TRENDS

In the introduction, we described three themes that provide a way of characterizing recent progress in the area of personnel selection. First, increased attention to criteria and models of performance is a promising development. For years, work on criteria lagged behind work already accomplished in several predictor domains. It is encouraging to see renewed energy applied toward development of taxonomies and models of performance. We expect this trend to continue for the foreseeable future. The reemergence of personality and related volitional constructs as predictors is also a positive sign, in that this trend should result in a more complete mapping of the KSAO requirements for jobs and organizations, beyond general cognitive ability, for example. What is even more exciting, however, is how these two themes come together to reveal interpretable relationships between individual predictors and criterion constructs. Much more work is needed to clarify these linkages, but it now appears, for example, that ability best predicts technical proficiency-related criteria and personality best predicts such criterion domains as teamwork, interpersonal effectiveness, and contextual performance. We strongly encourage continued research to discover and confirm relationships between ability, personality, experience, job knowledge, technical proficiency, extra-technical proficiency domains, and overall job performance. This work continues to help us raise personnel selection from a technology to a science.

The third theme, person-organization (P-O) fit research, is gaining in popularity. As mentioned earlier, we would like to see more clarity in how P-O fit is defined and measured. In addition, we need to gain more understanding of how effective the P-O congruence model is for personnel selection applications compared with the more traditional model of person-job matching. Conceptually, it seems that P-O congruence becomes a more appropriate model for selection where "the job" is not as relevant a concept. We look forward to further developments in P-O fit research that evaluate the usefulness of this model for selection.

More broadly, we are optimistic for the future regarding the science and practice of personnel selection. Beyond our central themes, meta-analyses suggest that many of our predictor measures are encouragingly valid for predicting job performance. Methods available for studying predictor-criterion links are increasingly powerful. In addition, new areas of research, such as applicant reactions, team selection, and computerized testing, are emerging and progressing. As public and private sector organizations reconfigure and reposition themselves to remain competitive in an expanding global environment, we believe that personnel selection research will play an important role in the process. We are enthusiastic about participating in the personnel selection research and practice enterprise of the future.

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